AGENDA & CONTENTS*
INFRARED TECHNOLOGY AND APPLICATIONS (ITA)
Georgia Institute of Technology

8:05 – 8:50 **I. Introduction**

8:50 - 9:40 **II. Overview**

9:40 - 9:50 Coffee Break

9:50 – 11:50 **III. Basic Concepts**

Blackbody Radiation
Selective Emitters

10:50 – 11:00 Coffee Break

Thermal Radiation Contrast
Radiometry
Atmospheric Transmission

11:50 – 12:50 **Lunch**

12:50 – 4:55 **IV. IR Imaging Systems**

Gen 1 FLIRs
Picture Forming Process
Parallel Scan Systems
Scanners, Coolers, & Accessories
Serial Scan Systems

2:00 – 2:10 Coffee Break

Gen 2 FLIRs
Focal Plane Arrays (FPAs)
- MOSFET Switches
- Readout Integrated Circuits (ROICs)
- Charge Skimming
- Nonuniformity Correction (NUC)

3:30 – 3:40 Coffee Break

Recent Developments - Scanning
Example Systems & Features
Example Video Imagery
Recent Developments – Staring

IR Imaging Systems (completed next morning)

4:55 End of Day Discuss, hand in test (optional)

*representative only, course is constantly changing due to on-going development to keep pace with rapidly evolving technologies

Second Day

8:00 – 8:10 Review of Day 1 Test Answers

8:10 - 10:40 **IV. IR Imaging Systems** (Completed)

Uncooled Imagers
Gen 3 FLIRs

9:20 - 9:30 Coffee Break

Ambient Light Imagers
2D & 3D Imaging Laser Radars
Image Fusion & Advanced Concepts

10:40 - 10:50 Coffee Break

10:50 – 3:15 **V. Properties of Scenes and Targets**

Signature Generation Mechanisms
Target Characteristics

12:00 – 1:00 **Lunch**

1:00 – 3:15 Properties of Scenes &Targets (completed)

Backgrounds & Clutter
Clutter Metrics

2:00 - 2:10 Coffee Break

Time Lapse Thermal Imagery
Hyperspectral Discrimination
Polarization Discrimination

3:15 – 5:00 **VI. Terminal Homing Seekers/IRSTs**

Part 1:
Guidance Laws & Implementation
CLOS, Laser Beam-Rider, PNG, ...
AM/FM Reticle Seekers

3:30 - 3:40 Coffee Break

Pseudo-imaging Seekers
Imaging Systems
Merit Functions

Terminal Homing Seekers (Completed next morning)

5:00 End of Day Discuss, hand in test (optional)

Third Day

8:00 - 8:10 Review of Day 2 Test Answers

8:10 - 8:55 **VI. Terminal Homing Seekers** (Completed)

Part 2: Autonomous Nonimaging Acquisition
Adaptive Spatial Filters
Spectral Discrimination
Infrared Search & Track (IRST)

8:55 - 10:15 **VII. Video Trackers**

Tracker Types & Algorithms
Example Video Imagery

9:20 - 9:30 Coffee Break

Tracker Performance Issues

10:15 - 2:35 **VIII. IR Optical Design**

Light Properties & Deflection
Infrared Windows & Signature Control
Ray Tracing & Terminology

10:30 - 10:40 Coffee Break

Telescopes & Displays
Real System Configurations & Examples

12:00 – 1:00 **Lunch**

1:00 - 2:35 IR Optical Design (Completed)

Shading & Narcissus Control
Cold Shields & Cold Filters

2:00 – 2:10 Coffee Break

Aberrations & Resolution Control
Scanning & Dither Techniques

2:35 – 5:05 **IX. Detectors**

Detection Mechanism Overview
Thermal & Quantum Detectors
Cooling Requirements
Merit Functions

3:30 – 3:40 Coffee Break

PC, PV, nBn, QWIP, & Superlattice Principles
Uncooled Microbolometer Principles
Example Video Imagery
Focal Plane Array Fabrication, Operability, & Yield

5:05 End of Day Discuss, hand in test (optional)

Fourth Day

8:00 – 8:10 Review of Day 3 Test Answers

8:10 - 10:10 **X. Evaluation Tools**

Modulation Transfer Functions (MTF)
Aperiodic Transfer Functions (ATF)
Typical System MTFs & Super Resolution

9:20 - 9:30 Coffee Break

Cascading MTFs
Example Problem & Solution

10:05 - 12:05 **XI. System Performance Analysis**

Minimum Resolvable Temperature (MRT)
Contrast Threshold Function (CTF)
Performance Prediction Models

10:40 – 10:50 Coffee Break

System Requirements Flowdown
Recent Developments in Modeling & Analysis
Overlooked or Incorrect Analytical Assumptions

12:05 - 12:20 **XII. Summary & Discussion**

12:20 End of Program